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UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/928,563	08/13/2001	Elliot Karl Kolodner	GB920000100US1	7167

7590 02/03/2005	EXAMINER
IBM Corp.	LEROUX, ETIENNE PIERRE
Intellectual Property Law	

ART UNIT	PAPER NUMBER
2161	

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DATE MAILED: 02/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/928,563	KOLODNER ET AL.
	Examiner	Art Unit	
	Etienne P LeRoux	2161	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>29 September 2004</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-39</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-3,5,6,10-16,18,19,23-29,31,32 and 36-39</u> is/are rejected.

7)☒ Claim(s) <u>4, 7-9, 17, 20-22, 30 and 33-35</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>13 August 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

Claims Status

Claims 1-39 are pending. Claims 1-3, 5, 6, 10-16, 18, 19, 23-29, 31, 32 and 36-39 are

rejected. Claims 4, 7-9, 17, 20-22, 30 and 33-35 are objected to.

Claim Objections

Claims 4, 7-9, 17, 20-22, 30 and 33-35 are objected to as being dependent upon a rejected

base claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 10, 12-15, 23, 25-28, 36, 38 and 39 are rejected under 35 U.S.C. 102(e) as

being anticipated by US Pat No 6,728,852 issued to Stoutamire (hereafter Stoutamire).

<u>Claims 1, 14 and 27:</u>

Stoutamire discloses:

- storage, a contiguous linear portion of which is logically divided into first and second

    heaps located at opposite ends of the storage portion, with any gap between the two heaps

representing an unallocated region of storage, wherein references are permitted from

objects on the first heap to objects on the second heap and vice versa col 6, lines 4-14]

- a garbage collector for operating across both heaps to remove objects that are no longer

  live [Figure 2A, col 4, lines 37-55, col 6, lines 27-38]

- a means for expanding the first heap into said unallocated region according to a first

  expansion policy [Fig 2A, 202]; and

- a means for expanding the second heap into said unallocated region according to a second

  expansion policy [Fig 2A, 220].

Claims 2, 15 and 28:

Stoutamire discloses wherein said computer system supports a transaction processing

environment, and said first heap is used for storing objects that are deleted at the end of the

current transaction, and said second heap is used for storing objects that persist from one

transaction to another [col 4, lines 45-54].

Claims 10, 23 and 36:

Stoutamire discloses wherein said garbage collector performs a compact operation after a

garbage collection of the first and second heaps, said compact operation being performed in

response to a first set of criteria relevant to the first heap, and a second set of criteria relevant to

the second heap [col 5, line 65-col 6, line 3, col 5, lines 5-16, col 6, lines 27-38].

Claims 12, 25 and 38:

Stoutamire discloses means for shrinking the first and second heaps after compaction,

and returning released storage to said unallocated region [col 4, lines 21-45].

Claims 13, 26 and 39:

Stoutamire discloses further including a bit array, having one bit for each possible object

location in said portion of storage, said bit indicating whether or not there is an object currently

stored at the corresponding object location [col 8, lines 35-42].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

Claims 3, 5, 6, 16, 18, 19, 29, 31 and 32 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Stoutamire in view of US Pat No 6,453,404 issued to Bereznyi et al (hereafter

Bereznyi).

Claims 3, 16 and 29:

Stoutamire discloses the elements of claims 1 and 2 as noted above.

Stoutamire fails to disclose wherein the first heap is reset to the same predetermined

initial size at the start of each transaction.

Bereznyi discloses wherein the first heap is reset to the same predetermined initial size at the start of each transaction [col 46, lines 34-64].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Stoutamire to include wherein the first heap is reset to the same predetermined initial size at the start of each transaction as taught by Bereznyi.

The ordinarily skilled artisan would have been motivated to modify Stoutamire per the above for the purpose of providing memory defragmentation [Bereznyi, col 46, lie 34].

Claims 5, 18 and 31:

Stoutamire discloses the elements of claims 1-3 as noted above.

Stoutamire fails to disclose wherein a midpoint is defined halfway between the first heap and second heap, when they each have their initial size.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Stoutamire to include wherein a midpoint is defined halfway between the first heap and second heap, when they each have their initial size.

The ordinarily skilled artisan would have been motivated to modify Stoutamire per the above for the purpose of defining the relative sizes of the first heap and the second heap.

Claims 6, 19 and 32:

Stoutamire discloses the elements of claims 1-3 and 5 as noted above.

Stoutamire discloses wherein the first expansion policy is always to expand into said

unallocated region in order to satisfy a storage request [col 4, lines 46-54]

Claims 11, 24 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Stoutamire in view of US Pat No 5,696,927 issued to MacDonald et al (hereafter MacDonald).

6,453,404

Claims 11, 24 and 37:

Stoutamire discloses the elements of claims 1 and 10 as noted above.

Stoutamire fails to disclose wherein said second set of criteria are more sensitive to

fragmentation than the first set of criteria.

MacDonald discloses wherein said second set of criteria are more sensitive to

fragmentation than the first set of criteria [col 12, lines 33-37].

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to modify Stoutamire to include wherein said second set of criteria are more sensitive

to fragmentation than the first set of criteria.

The ordinarily skilled artisan would have been motivated to modify Stoutamire per the

above for the purpose of removing unused data on the hard drive in order to consolidate data in

contiguous memory sectors.

Allowable Subject Matter:

The following is an examiner's statement of reasons for allowance:

<u>Claims 4, 17 and 30:</u>

The computer system wherein the system returns an error condition if the second heap has expanded such that it is not possible to reset the first heap to its predetermined initial size.

<u>Claims 7, 20 and 33:</u>

The computer system wherein the rate of expansion of the first heap into the unallocated region is slower once the first heap has passed said midpoint.

<u>Claims 8, 21 and 34</u>

The computer system wherein the second expansion policy is to expand into said unallocated region in order to satisfy a storage request until said midpoint is reached, whereupon said system preferentially performs a garbage collection to satisfy said request.

<u>Claims 9, 22 and 35:</u>

The computer system of claim 8, wherein the second expansion policy further includes trying to shrink the first heap to allow room to expand said second heap in order to satisfy a storage request.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments filed 9/29/2004 have been fully considered but they are not persuasive.

Applicant Argues:

Applicant states in the second paragraph on page 11 "Note that Stoutamire discloses only one heap or memory structure wherein objects are written or copied to different portions of the single heap or memory structure at issue. See col. 4 lines 46-54. Stoutamire does not disclose a contiguous linear portion of storage including a first heap and a second heap located at opposite ends of the storage portion, wherein any gap between the two heaps in an allocated region of storage, as disclosed in Applicant's independent claims 1, 14 and 27. This is a critical difference between Stoutamire's patent and Applicant's invention because the use of two heaps eliminates the problem of starting a new Java Virtual Machine (JVM) for every transaction."

Examiner Responds:

Examiner is not persuaded. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., contiguous linear portion of storage including a first heap and a second heap located at opposite ends of the storage portion, wherein any gap between the two heaps in an allocated region of storage) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Nevertheless, considering the essence of above comment by applicant, Stoutamire in

column 6, lines 5-15 discloses a storage device containing a first heap and a second heap per the

following disclosure:

> In the described embodiment, an overall heap within computer memory is divided into two sections, i.e., a
> heap section for uncompressed objects and a heap section for compressed objects. Hence, uncompressed
> object 202 is stored is stored in the heap section for uncompressed objects while compressed object 220 is
> stored in the heap section for compressed objects. Although the relative sizes of the heap sections may vary
> widely, the heap section allocated to compressed objects is often significantly smaller than the heap section
> allocated to uncompressed objects.

In response to applicant's argument that the references fail to show certain features of

applicant's invention, it is noted that the feature upon which applicant relies (i.e., the problem of

starting a new Java Virtual Machine (JVM) for every transaction) is not recited in the rejected

claim(s). Although the claims are interpreted in light of the specification, limitations from the

specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26

USPQ2d 1057 (Fed. Cir. 1993).

Applicant Argues:

Applicant states in the third paragraph on page 12 "The use of multiple heaps for

different types of objects further allows the handling of the heap to be fine-tuned to the

requirements of those types of object."

Examiner Responds:

Examiner is not persuaded. In response to applicant's argument that the references fail to

show certain features of applicant's invention, it is noted that the features upon which applicant

relies (i.e., multiple heaps for different types of objects) are not recited in the rejected claim(s).

Although the claims are interpreted in light of the specification, limitations from the specification

are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir.

1993).

Applicant Argues:

Applicant states on page 13 "The use of multiple heaps for different types of objects

further allows the use of multiple and different expansion policies for each heap."

Examiner Responds:

Examiner is not persuaded. In response to applicant's argument that the references fail

to show certain features of applicant's invention, it is noted that the features upon which

applicant relies (i.e., multiple and different expansion policies for each heap) are not recited in

the rejected claim(s). Although the claims are interpreted in light of the specification, limitations

from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26

USPQ2d 1057 (Fed. Cir. 1993).

Applicant Argues:

Applicant states in the third paragraph on page 13 "For these reasons, the Stoutamire

reference does not disclose, teach or suggest the aforementioned elements of independent claims

1, 14 and 27 – namely, a contiguous lines portion of storage including a first heap and a second

heap located at opposite ends of the storage portion, wherein any gap between the two heaps in

an unallocated region of storage. Thus, the examiner's rejection of these claims has been

traversed and the applicant respectfully requests that the rejection be withdrawn."

Examiner Responds:

Examiner is not persuaded. In response to applicant's argument that the references fail to

show certain features of applicant's invention, it is noted that the features upon which applicant

relies (i.e., claim 1 does not recite *a contiguous lines portion of storage including a first heap and a second heap located at opposite ends of the storage portion, wherein any gap between the two heaps in an unallocated region of storage*) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Furthermore, applicant is referred to above responses by examiner.

Applicant Argues:

Applicant states on pages 14 and 15 that Bereznyi and MacDonald do not correct the deficiencies of the Stoutamire reference.

Examiner Responds:

Examiner is not persuaded. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure:

Pub No US 2004/0158589 to Liang et al discloses a method and apparatus for profiling a

heap employing a set of virtual machine profiling interface events that support all known types

of garbage collection methods.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Etienne LeRoux whose telephone number is (571) 272-4022.

The examiner can normally be reached on Monday – Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Safet Metjahic, can be reached on (571) 272-4023.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is (571) 272-2100.

Patent related correspondence can be forwarded via the following FAX number (703)

872-9306

Etienne LeRoux

12/29/2004

WAYNE AMSBURY

PRIMARY PATENT EXAMINER